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Picture This: Using Data Visualization to Drive Results

Casualty Loss Reserve Seminar
September 17, 2020

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Agenda

- Learning objectives
- What is data visualization
- Getting Started and Reserving Applications
- Demo: Reserving Visuals in Power BI
- Applications across the organization
- Demo: Management Reporting in Tableau
- Best Practices
- Q&A



Learning objectives

- 1 Identify where to apply DV in reserving and your organization
- 2 Recognize the benefits of using DV
- 3 Understand the approach, considerations, and possibilities for incorporating DV
- 4 Be familiar with various DV software, their requirements, and their benefits
- 5 Enhance dialogue and understanding by using effective and engaging DV

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What is Data Visualization?

- Intelligent graphs and charts facilitate data discovery and root cause analysis
- Dynamic dashboards that enable users to interact with significant amounts of data to generate insights
- Flexible visuals that can aggregate or dissect data to analyze its dimensions and KPIs
- Collaboration and communication tool to interface with a variety of users

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Why data visualization?

- 90% of information transmitted to the brain is visual -Theripoylae
- Observations are interactive and shared across teams and various devices
- 93% of communication is non-verbal -UCLA
- Presentations with visuals are 43% more persuasive than those with words alone - Duarte
- “Good data visualizations create an ‘aha’ of understanding, turning it into information that can be used to reveal insights & drive actions” -Cole Nussbaumer, author of *Storytelling with Data*
- Review/discover “heavy” topics in an enjoyable way
- Visuals processed 60,000x faster in the brain than text -Theripoylae
- It allows trends and patterns to be more easily seen


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Getting Started

Our experience has highlighted a **few key lessons learned/areas of focus** in implementation


- Project scope
- Stakeholder needs
- Data sourcing
- Organizational change management
- System access controls
- Input management & review
- Auditor/regulator access (for core financial visuals)
- Visualization software selection

These areas must be **planned and managed effectively** to ensure a successful business transformation



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Approach


Gathering **Data** and building **Visuals** are enhanced with **Collaboration**

Data 


- **Select** – Discuss, understand and select data that supports purpose
- **Collect** – Collect, import, aggregate all relevant data sources
- **Process** – Process and validate to produce meaningful information
- **Enrich** – Transform or enrich the data to make it more meaningful and dynamic

Visualization 

- **Create** – Develop and design visuals with dashboards
- **Validate** – Review and test results with existing reports
- **Collaborate** – Receive input and feedback
- **Test** – Company users test workbook
- **Enhance** – Evolve and enhance visuals iteratively

Collaboration 


- **Release** workbook to users
- **Train** users
- **Transfer** knowledge
- **Update/enhance** visuals


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Data Sourcing

- *Inventory of data sources* – can be in various formats and from multiple sources:

Data Source	Description	Examples
Traditional servers	Visualization software offers direct interfacing with ODBC and OLEDB servers	SQL Server, Oracle, Hadoop
Standard table files	Traditional table and data file formats are supported as well	Excel, CSV, text, Access
Web sources and APIs	Non-traditional cloud-based connections are supported and can be accessed through add-in or direct connections supported by third-party vendors	Salesforce, Google™ Analytics, Twitter


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Data Sourcing Continued

- Software interfaces – common data upload features:

Upload Feature	Description	Examples
Upload templates	Source specific upload interfaces	SQL Server, Oracle, Hadoop, Power BI
Query/Code view	SQL/ETL programming oriented data interface	Edit Script View (QlikView), Power BI
Pre-processing	Automated data preparation	Data Interpreter (Tableau), Associative Engine (QlikView), Power BI

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Knowledge check #2

What should be considered prior to building a visualization dashboard?

A. Validation of the visual results in relation to existing reports

B. Education of end users on how to drill and analyze results using DV tools

C. The visual maintenance plan for keeping source data up to date

D. Identification and validation of an appropriate data set to power the desired dashboard

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Applications in Actuarial Reserving

Gather and prepare data

Produce analysis


Review and approve

Analyze and Communicate

Take action

- Discover errors in the data
- Select lines of business for review based on maturity, volume, and volatility of segmented lines
- Find anomalies prior to completing analyses
- Discover trends at the lowest and aggregated levels
- Aide in making more accurate selections for reserving parameters
- Uncover troubled areas
- Enhance peer review process
- Allow approver to conduct own research
- Focus on core causes/change drivers
- Show cause/effects through interactive visuals versus static powerpoint or exhibits
- Increased dialogue and clearer messaging
- Dashboards tailored to the audience providing transparent communication
- Monitor areas of concern
- Quickly translate insight into action
- Coordinate across all stakeholders improving strategic decision-making across the organization


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Demo: Reserving Visualization in Power BI

Application across the Organization

Unifying the Organization



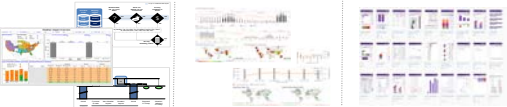
Past Benefits

- Finance:** Dynamic reports improved efficiency, transparency, and richer insights with convergence of claims, pricing, reserving and underwriting.
- Claims:** Multi-dimensional views of data identified potential fraud attributes earlier
- Underwriting:** Enhanced granular data view identified exposures driving loss ratio deterioration
- Pricing:** Price monitoring visualization identified areas of biases in new versus renewal, which caused increasing disparity between pricing and actual rates

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Benefits by Role in the Organization

Corporate/BU/LoB Executives	Underwriting/Actuarial Leads	Actuarial Manager/Staff
<ul style="list-style-type: none"> Dashboard presentation of on-demand actuarial updates Aggregated to the various organizational reporting levels Delivered in an easy-to-understand format 	<ul style="list-style-type: none"> Monitor trends and drill down into the detail on-demand Reduce delays in recognizing favorable or unfavorable developments Clear view on the bigger picture Efficient creation of management information reporting 	<ul style="list-style-type: none"> Spot trends and drill down into the detail on specific claims, all in one place Increase speed of recognition and root cause analysis Enhance ability to see the bigger picture Key messages from the team are brought to the forefront




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Benefits across the Organization

- **Earlier warning** on trouble areas that can be monitored for development
- **Empowered** actuarial staff and managers with a clearer purpose and a broader understanding
- More accurate reserving decisions and **reduced volatility** in reserves
- **Increased dialogue** and clearer messaging between the actuarial department and key stakeholders
- **Clearer presentation** to key external stakeholders, including analysts and shareholders

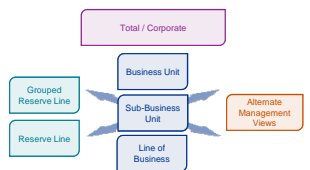
...ultimately leading to **improved strategic decision** making across the organization



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Storyline Process

- Visuals create “storylines” to **streamline messaging** around business problems and performance in an interconnected manner.
- **Headline information** is rolled up through the organizational structure to reflect Alternate Management View



- Linked numbers from bottom-to-top
- Hierarchical roll-up
- Matrix transparency across hierarchies
- Summary stories at all levels

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Demo: Management Reporting in Tableau

Knowledge check #3

Which of the following was observed in the demo?

A. The connection between reserve selections and the underlying claims that drove reserve changes
B. Detailed information on the underlying drivers of the change
C. Trend information informing the user on experience changes over time
D. All of the above

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ASOP 41 – Actuarial Communications

Definition 2.1: A written, electronic, or oral communication issued by an actuary with respect to actuarial services.

3.1.1 Form and Content
The actuary should take appropriate steps to ensure that the form and content of each actuarial communication are appropriate to the particular circumstances, taking into account the intended users.

3.1.2 Clarity
The actuary should take appropriate steps to ensure that each actuarial communication is clear and uses language appropriate to the particular circumstances, taking into account the intended users.

3.6 Oral Communications
Where the actuary has a concern that the oral communication may be passed on to other parties, the actuary should consider following up with an actuarial document.

4.1 Disclosures
Responsible actuary, intended user and purpose, limitations or constraints

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Leading practices

Do's and Don'ts for effective and engaging visuals

Leading practices - Choosing charts

Organize

- Ordered bar chart
- Flow chart
- Venn diagram

Important data point

- Single big number
- Donut chart
- Pictograph

Data Validation

- Cross table
- Scatter plots
- Box & whiskers

Compare categories

- Bar chart
- Bubble chart / tree map
- Pie chart
- Word cloud

Correlations or distributions

- Scatter plot
- Histogram
- Multi-series chart

Change by time or location

- Line chart
- Timeline
- Area chart
- Map

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Leading practices – Do's and Don'ts

Do

Estimated Margin to Carried Margin % Carried

Don't

Estimated Margin to Carried

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Leading practices – Do's and Don'ts

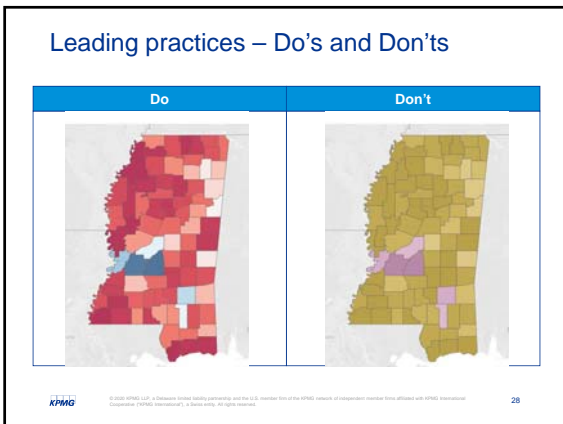
Do

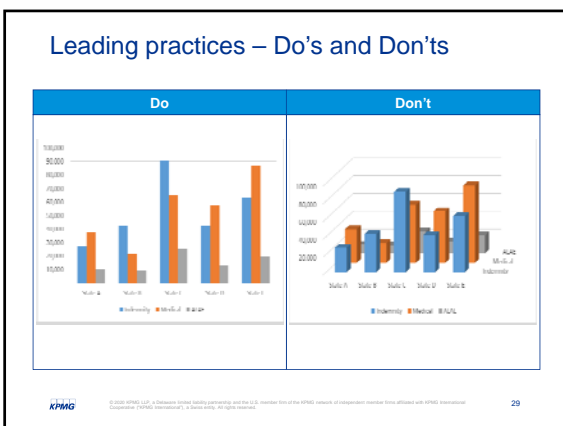
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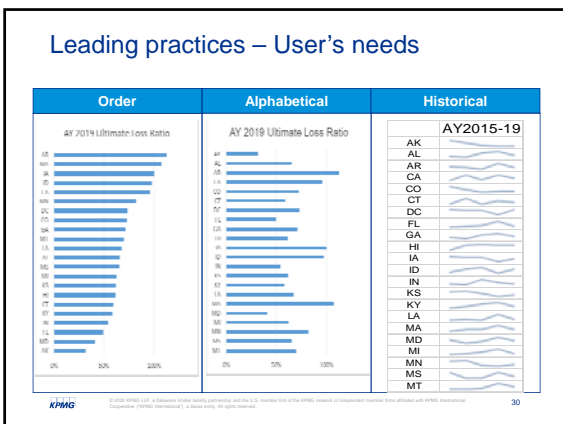
Don't

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Leading Practices - Colors

- Avoid red/green combinations for those that have color blindness
- See Color Brewer, designed by Cynthia Brewer, to get information on well-designed palettes
- Categorical – distinct groups
- Sequential – quantitative differences
- Diverging – quantitative differences



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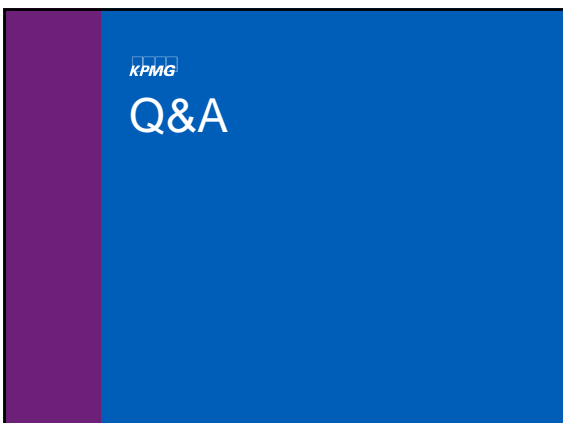
Knowledge check #4

Which of the following charts should you use for relationships between two continuous variables?

A. Scatter Plot
B. Bubble Cloud
C. Pie Chart
D. Timeline

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Q&A

